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## The hyper library

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*Published in:*  
Proceedings Libraries in the Digital Age (LIDA) 2006

*Publication date:*  
2007

*Document Version*  
Publisher's PDF, also known as Version of record

[Link to publication from Aalborg University](#)

*Citation for published version (APA):*  
Rosenstand, C. A. F., Rosenstand, M-B. T., & Stehouwer Øgaard, L., (TRANS.) (2007). The hyper library. In *Proceedings Libraries in the Digital Age (LIDA) 2006* Osijek: Faculty of Philosophy University.

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## ***The hyper library***

In this paper we would like to address the function of what we term *the hyper library* – a function that seeks to reduce the complexity of today’s hyper complex society. The hyper library is characterized by the way in which it loosely connects the library activities search, seek and learn. The library user has to be innovative to connect library activities in relation to specific challenges – the user also has to be in the situation that we term “innovation”.

SWIM – an e-learning system based on interactive video – is based on a pedagogical framework, which partly covers the understanding of the hyper library. On the basis of this, the pedagogical framework is expanded to reflect modern society and the digital age.

The result of this extension is an innovative pedagogical model: Need-based learning – a model which adds a new dimension to the understanding of information literacy and, in relation to SWIM, might serve as a design pattern for future generation e-learning systems.

### **1. Library activities**

Modern society is hyper complex (Qvortrup, 1998). It is a fundamental condition that the complexity of the society cannot be reduced into a non-complex phenomenon – and we remain open to this condition when we observe and act in society. In other words: The same phenomenon has multiple truths. There are multiple points of view on the same phenomenon, and the cultured member of a society understands and accepts this in his interaction with other members of the society – or other societies.

The complexity – and uncertainty – of modern society is expressed in information. In order to be able to handle information we need to be information literate on four skill levels: Qualifications, competencies, creativity and culture<sup>1</sup>.

| <b>Skill</b>   | <b>Focus</b> | <b>Library activity</b> |
|----------------|--------------|-------------------------|
| Qualifications | Tools        | Search                  |
| Competencies   | Process      | Seek                    |
| Creativity     | Product      | Learn                   |
| Culture        | Organisation | Hyper library           |

The library is not understood as the physical library, but rather as a cultural function – or a social activity – to set up conditions to handle information by iteration of search, seek, and learn. Libraries are an important answer to hyper complexity. However, when the question is hyper complexity the library should also be in a hyper modus. To emphasize this we call the library in the hyper complex society *the hyper library*.

The hyper library does not set up simple conditions to reduce complexity - fixed relations between search, seek, and learn. The hyper library is a flexible library, which can be altered by the library user – the same phenomenon can be handled from different points of view – from different multidisciplinary perspectives. The ways in which disciplines are connected in relation to different

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<sup>1</sup> The skill levels qualifications, competences, creativity and culture are developed by Lars Qvortrup (1998, 01, 04) and based on the learning theory of Bateson, which has four adequate levels of learning – first, second, third and fourth order of learning.

challenges are infinite, and this is why the relation between searching, seeking and learning must be loosely connected in the hyper library.

Different digital solutions seem to be the most practical way to design the hyper library with its products, services and experiences. It is indeed very hard to imagine the hyper library without digital solutions. The digital age is more a result of the hyper complex society and its institutions, such as hyper libraries, rather than the hyper complex society is a result of the digital age. Hyper is the cause and digital the effect – databases, search engines, electronic journals, e-learning, 24/7 on-line librarians etc.

## 2. Innovation

When the hyper library is characterized by a loosely connected relation between search, seek and learn, the library user needs to establish his own connections. These connections may be dynamic as a function of the learning process. The librarian too must have the competencies to facilitate this during the learning process.

You could say that the library user needs to invent a new specific methodology each time he has to handle information associated to a specific challenge. He needs to be innovative, where we understand innovation as a new connection between resources, performance and results – a change of the conditions regarding the relations between search, seek and learn.

| Library activity | Level of mind | Situation           |
|------------------|---------------|---------------------|
| Search           | Resources     | Routine             |
| Seek             | Performance   | Problem solving     |
| Learn            | Results       | Problem orientation |
| Hyper library    | Conditions    | Innovation          |

With the aid of the librarian, the library user should be information literate in four types of situations. Firstly, the library user has to master routines to use tools to access resources. Secondly, the library user has to perform a problem solving process when he seeks answers to problems. Thirdly, the library user has to orient himself towards problems with the result of learning. Finally, the library user has to be innovative and set up new conditions for the relation between resource, performance and results – tools, processes and products – in the hyper library.

## 3. SWIM

The three situations – routine, problem solving, and problem orientation – have been used as a design pattern for the Danish simulative e-learning system SWIM (Rosenstand 04: 100). SWIM is produced in Danish; however a version with English subtitles is available at the Internet:

[http://www.aub.aau.dk/swim/swim\\_uk/adsl/splashintro.html](http://www.aub.aau.dk/swim/swim_uk/adsl/splashintro.html)

A new international version of SWIM, SWIM2, will be published in the summer 2006. SWIM2 is not just an English version of SWIM1, but the result of an independent development project based on experiences with the development, implementation and use of the original version. Several major changes separate the two products<sup>2</sup>.

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<sup>2</sup> A more detailed description of the SWIM2 concept is available at:  
<http://www.learningobjectsworld.dk/pdf/The%20SWIM2%20concept.pdf>

SWIM uses the computer as a simulative media (Qvortrup 03), where the computer simulates phenomena of the outside world, in which the user, or student, is situated as co-player (Rosenstand 02: 104). SWIM is developed by Aalborg University Library. The purpose of SWIM is to increase the users' ability to seek and search for information in relation to a problem-based learning (PBL) process. At Aalborg University this pedagogical approach normally takes place in project groups.

SWIM consists of different interface components. However, it is only the simulative part that will be discussed here (Figure 1). It is an interactive video, which simulates project group work. Each video sequence represents a situation and a phase in the project work, in which the user as co-player is able to choose among various information search strategies. Furthermore, there is a video of the final examination where the marks 6, 9, or 11 are given (these are Danish marks, on a scale from 00 to 13). Depending on how the user as co-player has chosen to search for information in the course of the game, SWIM's state machine generates a video-based feedback, in which the external examiner and the project advisor reflect and comment on the way the user as co-player has chosen to search for information in the various phases of project work. (Rosenstand, 2004)

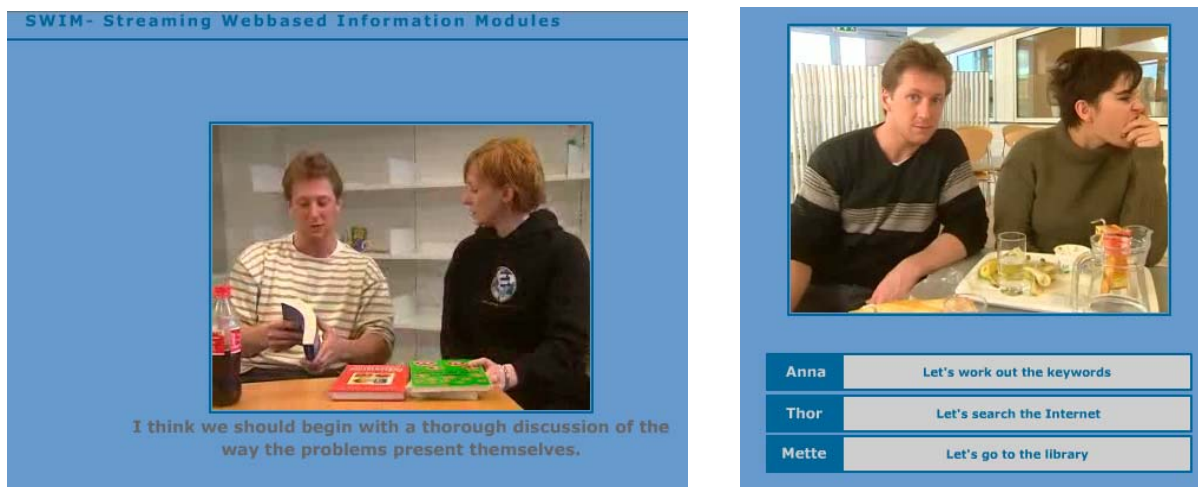


Figure 1: SWIM. The video sequences are followed by interactive choices representing different information search strategies.

The framework below is part of the actual design pattern behind SWIM. In the situation that we term “routine”, both method and problem are known. In the situation termed “problem solving”, the problem is known but the method has not been selected. And in the situation termed “problem orientation”, neither method nor problem has been selected. The three types of situations – routine, problem solving, and problem orientation – match the three pedagogical models.

| Situation           | Pedagogy                  | Method | Problem |
|---------------------|---------------------------|--------|---------|
| Routine             | Definition-based learning | +      | +       |
| Problem solving     | Solution-based learning   | -      | +       |
| Problem orientation | Problem-based learning    | -      | -       |

Different information search strategies match different situations and project phases. The specific phases in SWIM are based on a general model of project phases (Carol Kuhlthau, 2004).

Through practice, SWIM has proven to be a strong tool for learning information search strategies in relation to problem-based learning. Problem-based learning integrates both definition-based and solution-based learning. The learning process is an iterative situation – through routine, problem solving, and problem orientation.

However, SWIM does not cover the situation that we term “innovation”!

We would like to extend the framework to include the situation we term “innovation”, and suggest that it might work as a design pattern for future generations of the e-learning system.

SWIM serves as an example that covers the library activities search, seek, and learn. The system is developed from and uses a pedagogical framework, which departs in the users situation and facilitates the user's reflection in the learning process. It is intended to be applied in courses for 1<sup>st</sup> – 2<sup>nd</sup> year students in a blended learning environment. Further development of the concept is in progress in the new development project; Learning Objects Web. The concept implies that the user interface and content will be customizable and used in a project organized and problem oriented collaborative environment, where the user can give external mediators access to vital areas in the system. This is intended to give the user a new tool, which allows a focused control of the learning process, and the learning process might very well cover the situation innovation.

#### 4. An innovative pedagogical model

As mentioned earlier (cf. 1. Library activities), the hyper library is a flexible library, which can be altered by the library user – the same phenomenon can be handled from different points of view – from different multidisciplinary perspectives. The manner in which disciplines are connected in relation to different challenges are infinite.

Thus, on order to extend the framework behind SWIM, we need to add choice of discipline and the situation that we have termed “innovation”:

| Library activity | Situation           | Pedagogy                  | Method | Problem | Discipline |
|------------------|---------------------|---------------------------|--------|---------|------------|
| Search           | Routine             | Definition-based learning | +      | +       | +          |
| Seek             | Problem solving     | Solution-based learning   | -      | +       | +          |
| Learn            | Problem orientation | Problem-based learning    | -      | -       | +          |
| Hyper library    | Innovation          | Need-based learning       | -      | -       | -          |

The result is a new innovative pedagogical model for *need-based learning*.

It is known that the dominant pedagogical model and the form of society match each other through the history (Qvortrup 1998, 01, 04). A short historical analysis of this, in relation to the libraries, is presented in another paper (Rosenstand, Rosenstand, Pedersen, and Gylstorff, 2005). However, what we would like to suggest is that the innovative pedagogical model is based on needs, because needs are fixed points in the hyper complex society. When the same phenomenon can be handled from different points of view, different types of problems will emerge as a result of the multiple disciplines chosen, combined and fixed in order of priority.

Need-based learning integrates definition-based, solution-based and problem-based learning. The learning process is an iterative situation – through routine, problem solving, problem orientation, and innovation.

The extended framework might work as a design pattern for a new e-learning system, where the user in the situation “innovation” has to combine disciplines and fix an order of priority.

Of course the learning context in which SWIM is used can cover the situation innovation. However a design principle of the story of the interactive video in SWIM is not to mention disciplines, because SWIM then can be used at different educations, faculties and institutions. However again in SWIM2 this is addressed by writing the role of the coach as mediator: counselor into the story of the interactive video. "The counselor guides and supports the user, offering encouragement, strategies, sequence, depth, format, and redefinition through exploration and formulation in preparation for collection and presentation" (Kuhlthau 04: 126). Pointing out this in the learning context, in which SWIM2 is used, can very well be used to support a qualitative discussion of the hyper library, situation innovation, and need-based learning<sup>3</sup>.

Doing this will also supports the philosophy behind SWIM and SWIM2, which is to move from a traditional instruction to information literacy education, where the e-learning systems are viewed as a means in the pedagogical development of the blended learning environment at Aalborg University Library, Denmark (Blaabjerg 2005).

## 5. A new dimension of information literacy

It is a skill to be in the situation "innovation" – using the hyper library – and as such this skill adds a new dimension to information literacy. Here, we would like to stress two major points: Firstly, the cultured library user should be capable of working in a multidisciplinary fashion, something which very often occurs in groups, where the members have different perspectives – different truths. Secondly, the cultured library user should be capable of keeping focus on needs and not stay fixed on specific problems, solutions, or routines. Needs such as faster, easier, complexity reduction, organization, and management are static – problems, solutions, and routines are dynamic.

The hyper library offers products, services, and experiences that support the uncertain choice of disciplines matching the library user and the challenges he is facing. The hyper library must have an operative and structural form, which allows a dynamic crossing and connecting of multiple disciplines.

The librarians will face new demands starting with actual comprehension of the concept of the hyper library. Moreover, it is important that the librarian possesses the necessary commutation skills to be able to move across multiple disciplines. The librarian must also be familiar with and capable of supporting the loosely connected search, seek, and learning process.

An e-learning system could very well help the librarian in supporting the need-based learning process of the library user. This could take place through e.g. a dynamic, multi-user, on-line facility, where the library users can structure library material according to different situations, library activities, phases of project work, and specific challenges. The idea behind this type of multi-user function is to support project groups. Furthermore, a system such as this could very well be adaptive and "learn" from how it is used by all library users; suggesting how material and the related disciplines could be related.

Naturally, an interactive video like SWIM could offer an immersive experience, which could provide an easy understanding of the hyper library and the related library activities and learning processes.

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<sup>3</sup> The proposed workshop at LIDA 2006 by Niels Jørgen Blaabjerg, Thomas Vibjerg Hansen, and Bo Hvass Pedersen "Construction of Knowledge – innovative use of e-learning and blended learning in information literacy education" will also address this in the discussion.

## 6. Conclusion

In the hyper complex society, the library too must be in a hyper modus. The hyper library is characterized by the way in which it loosely connects the three library activities: Search, seek and learn – from multidisciplinary perspectives.

To use the hyper library, the library user must have extended information literacy in order to be innovative – he also has to be in the situation that we have termed “innovation”: To set new conditions for the relation between resources, performance, and results – routine, problem solving, and problem orientation.

This is new in terms of design patterns for e-learning systems. SWIM, an interactive video, serves as example of an e-learning system that does not cover the innovative situation.

This leads to a new innovative pedagogical model, in which the innovative and multidisciplinary dimensions are incorporated – i.e. *need-based learning* integrating definition-based, solution-based and problem-based learning.

Thus, the innovative dimension is added to information literacy. The cultured library user should be capable of working in a multidisciplinary fashion and to keep focus on needs. The librarian has to be capable of facilitating the innovative search, seek, and learn process, and the hyper library must have an operative and structural form that allows a dynamic crossing and connecting of multiple disciplines.

Future library e-learning systems could very well be designed with the suggested innovative pedagogical framework as an essential part of the design pattern.

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